Speed-up for Darlingtons

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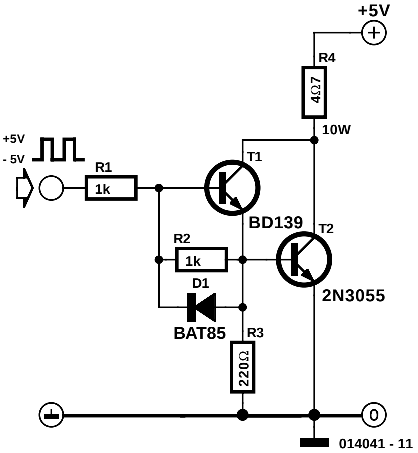

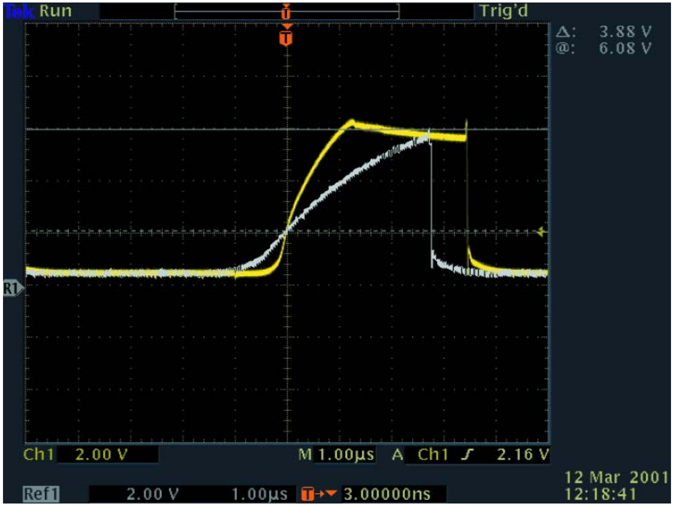

Darlingtons are useful devices because they have a pleasantly high gain. A disadvantage however, is that they are much slower than normal transistors, something that becomes even more of an issue if the two base-emitter resistors have relatively high values. The reason is that the charge in the base can be dissipated only slowly. In reality this can only happen in the base/emitter junction itself or via the relatively high base-emitter resistor (R2). There is not much that can be done with ready-made 'three legged' darlingtons, but with do-it-yourself darlingtons both base connections are readily accessible, which makes it possible to apply 'minor surgery' in the interest of a little improvement. The operation consists of the addition of a (Schottky-)diode in the blocking direction across the base-emitter junction (D1). This diode can provide a considerable reduction in turn-off time. The consequences for the reproduction of, for example, a 113-kHz square wave are clearly illustrated by the oscilloscope traces shown here, where one trace is with, and one without, the additional diode.

To avoid any misunderstandings, we would like to add that this 'diode trick' really only works well when the input voltage goes negative with respect to ground.

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